

## Claims

1. An integrated circuit system comprising:

at least one integrated circuit having a substrate with  
5 at least one semiconductor component assembled on the  
substrate;

a cooling body configured to dissipate heat generated  
by the integrated circuit; and

a latent heat storage module having a latent heat  
10 storage medium which is thermally connected to the cooling  
body to temporarily store the heat generated by the  
integrated circuit and to convey it to the cooling body, the  
substrate being in direct thermal contact with the latent  
heat storage module.

15 2. An integrated circuit system according to claim 1,  
wherein the substrate is a direct copper bonding substrate  
which is formed by a ceramics structure coated at least  
partially with copper on the front and rear side thereof.

3. An integrated circuit system according to claim 1,  
20 wherein the substrate is mechanically fixed to the latent  
heat storage module by at least one screwed connection.

4. An integrated circuit system according to claim 1,  
wherein the substrate is mechanically fixed to the latent  
heat storage module by a material-joining connection.

5. An integrated circuit system according to claim 4,  
wherein the material-joining connection is formed by  
soldering, welding or gluing.

5 6. An integrated circuit system according to claim 1,  
wherein the latent heat storage module has a latent heat  
storage housing which forms a hollow body filled with the  
latent heat storage medium.

7. An integrated circuit system according to claim 6,  
10 wherein the latent heat storage housing includes a wall in  
thermal contact with the integrated circuit and at least  
partially formed by the substrate.

8. An integrated circuit system according to claim 7,  
wherein the substrate has at least one electrically  
15 conductive thermal coupling element on which the  
semiconductor component is assembled and an electrically  
insulating frame in which the thermal coupling element is  
embedded.

9. An integrated circuit system according to claim 8,  
20 wherein the thermal coupling element has a substantially U-  
shaped cross-section, the semiconductor component is  
assembled on the base of the thermal coupling element and  
the two limbs of the thermal coupling element are surrounded  
by the latent heat storage medium.

10. An integrated circuit system according to claim 8,  
wherein the thermal coupling element forms the electrical  
bulk bonding of the semiconductor component.

11. An integrated circuit system according to claim 10,  
5 wherein two or more semiconductor components are provided  
having different bulk potentials, and various thermal  
coupling elements electrically insulated from one another  
are provided for the semiconductor components with different  
bulk potentials.

10 12. An integrated circuit system according to claim 1,  
wherein the latent heat storage housing includes a wall in  
thermal contact with the cooling body and at least partially  
formed by the cooling body.

13. An integrated circuit system according to claim 1,  
15 further comprising at least one heat-conducting rib  
thermally connected to the latent heat storage housing and  
protruding into the interior volume of the hollow body.

14. An integrated circuit system according to claim 13,  
wherein the heat-conducting rib is formed by a plate which  
20 is held on the latent heat storage housing in corresponding  
grooves of a wall of the latent heat storage housing.

15. An integrated circuit system according to claim 13,  
wherein the latent heat storage housing is formed by  
strengthened peripheral regions of a plurality of heat-

conducting ribs arranged substantially in parallel to one another and connected to one another.

16. An integrated circuit system according to claim 15,  
wherein the heat-conducting ribs are connected to one  
5 another via grooves and tongues formed in the strengthened  
peripheral regions.

17. An integrated circuit system according to claim 1,  
wherein the semiconductor component is connected to the  
substrate by a soldered connection.

10 18. An integrated circuit system according to claim 1,  
wherein the semiconductor component is connected to the  
substrate by a glued connection.

19. An integrated circuit system according to claim 1,  
wherein the semiconductor component is connected to the  
15 substrate by a press-fit connection.

20. An integrated circuit system according to claim 1,  
wherein the latent heat storage medium is paraffin.

21. An integrated circuit system according to claim 1,  
wherein the semiconductor component is electrically  
20 connected on an upper side thereof by at least one wire-  
bonded connection.

22. An integrated circuit system according to claim 1,  
wherein the semiconductor component is electrically

connected on an upper side thereof by at least one joined connection.

23. An integrated circuit system according to claim 1,  
wherein the semiconductor component is electrically  
5 connected on an upper side thereof by at least one press-fit connection.

24. An integrated circuit system according to claim 1,  
wherein the cooling body has at least one cooling rib for conveyance of heat.

10 25. An integrated circuit system according to claim 1,  
wherein the cooling body is connectable to a cooling circuit.

26. A latent heat storage module for use in a cooling device for cooling of at least one integrated circuit, the  
15 latent heat storage module having a latent heat storage medium and being thermally connected to a cooling body for conveyance of heat generated by the at least one integrated circuit and directly thermally connected to a substrate on which the at least one integrated circuit is mounted to  
20 temporarily store the heat generated by the integrated circuit and to convey it to the cooling body.

27. A latent heat storage module according to claim 26,  
wherein the latent heat storage module is configured to have

the substrate mechanically fixed thereto by at least one  
screwed connection.

28. A latent heat storage module according to claim 26,  
wherein the latent heat storage module is configured to have  
5 the substrate is mechanically fixed thereto by a material-  
joining connection.

29. A latent heat storage module according to claim 28  
wherein the material joining connection is soldering,  
welding or gluing.

10 30. A latent heat storage module according to claim 26,  
wherein the latent heat storage module has a latent heat  
storage housing which forms a hollow body filled with the  
latent heat storage medium.

31. A latent heat storage module according to claim 30,  
15 wherein the latent heat storage housing includes a wall in  
thermal contact with the integrated circuit and at least  
partially formed by the substrate.

32. A latent heat storage module according to claim 30,  
wherein the latent heat storage housing includes a wall in  
20 thermal contact with the cooling body and at least partially  
formed by the cooling body.

33. A latent heat storage module according to claim 30,  
further comprising at least one heat-conducting rib

thermally connected to the latent heat storage housing and protruding into the interior volume of the hollow body.

34. A latent heat storage module according to claim 33,  
wherein the heat-conducting rib is formed by a plate which  
5 is held on the latent heat storage housing in corresponding  
grooves.

35. A latent heat storage module according to claim 33,  
wherein the latent heat storage housing is formed by  
strengthened peripheral regions of a plurality of heat-  
10 conducting ribs arranged substantially in parallel to one  
another and connected to one another.

36. A latent heat storage module according to claim 35,  
wherein the heat-conducting ribs are connected to one  
another by grooves and tongues.

15 37. A latent heat storage module according to claim 36,  
wherein the grooves and tongues are formed in the peripheral  
regions and extend around the periphery of the heat  
conducting ribs.

38. A latent heat storage module according to claim 26,  
20 wherein the latent heat storage medium is paraffin.